found in a head-stream of the Red River, Wichita County, Texas, by J. W. Mallet. The analysis yielded iron over 90 per cent., nickel over 8, a little cobalt, tin, phosphorus, copper, sulphur, graphitic carbon, silica, and a trace of manganese.—The life and work of Jean-Baptiste-André Dumas, by J. P. Cooke.—Account of a new meteorite discovered in Grand Rapids, Michigan, on May 15, 1883, by J. R. Eastman. The analysis of the fragment now in the Smithsonian Institute yielded: iron 94·543, nickel 3·815, cobalt 0·369, insoluble residue 0·118.

Rivista Scientifico-Industriale, September 15-30.—Origin of atmospheric electricity, of thunder-clouds and volcanic eruptions, by Giovanni Luvini.—Description of an automatic and continuous registrator of electric energy transmitted at a given part of a circuit, by Prof. Rinaldo Ferrini.—On the electric conductivity of greatly diluted saline solutions, by Dr. Giuseppe Vicentini.—On a system of electro-chronometric bells adapted to private residences, by Giuseppe Bianchedi.—Note on the Walker railway-carriage break, by Angiolo Villa.—On a new system of simultaneous telegraphy and telephony, by M. Van Rysselberghe.—Descriptive notes on the fauna of Sardinia, by Prof. A. Costa.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, November 6.—Dr. Perkin, F.R.S., President, in the chair.—It was announced that a ballot for the election of Fellows would take place at the next meeting of the Society (November 20).—The following papers were read:—On the action of aldehydes and ammonia upon benzil (continued), by F. R. Japp and S. C. Hooker. In previous papers two general reactions have been studied relating to the joint action of aldehydes and ammonia upon similar bodies; in addition, a third totally distinct reaction occurs, which is investigated in the present paper. The authors have studied the action of salicylaldehyde and ammonia upon benzil. A condensation-product, $C_{28}H_{24}N_2O_4$, was obtained, which proved to be dibenzoyldihydroxystilbenediamine. By the action of dilute hydrochloric acid, the hydrochloride of a new base, $C_{14}H_{16}N_2O_2$, was formed; its platinum salt, picrate, sulphate, diacetyl derivative, &c., were prepared and examined. The authors have also studied the action of furfuraldehyde and ammonia upon benzil.—Isomeric modifications of sodium sulphate, by S. U. Pickering. The author has determined the heat of dissolution of effloresced sodium sulphate heated to various temperatures. He concludes that there are two modifications: one formed by not heating above 150°, the other being produced at temperatures from 150° to the fusing-point of the salt.—On some vanadates of the amines, by G. H. Bailey. The author has prepared and studied a considerable number of these bodies, and has compared them with the corresponding vanadates of the alkalies.—Contributions to our knowledge of acetoacetic ether, part 1, by J. W. James.—On magnesium hydrosulphide solution and its use in chemico-legal cases as a source of hydrogen sulphide, by E. Divers and T. Shimidzu. The authors prepare this solution by passing ordinary hydrogen sulphide into a flask containing magnesia suspended in water. By heating the solution to 60°, a steady stream of hydrogen sulphide free from hydrogen and from hydrogen arsenide is obtained.—On the origin of calcium thiosulphate: an emendatory note to a paper on calcium hydrosulphide, by E. Divers. The author concludes that there is essentially only one method of forming the thiosulphate, *i.e.* by the union of sulphur with calcium sulphite.

Physical Society, November 8.—Prof. Ayrton in the chair.—Mr. Kavargee was elected a member of the Society.—Prof. F. Guthrie read a paper on certain phenomena attending mixture. In a previous paper Dr. Guthrie had noticed the increase of volume attending the separation of triethylamine and water effected by heat. The present paper is an account of a more thorough examination of this and allied phenomena. Experiments conducted with a number of different liquids showed that mixtures can be arranged in two distinct classes. Of the first a mixture of water and ether is an example: when shaken up together they mix, heat is *evolved*, and a *diminution* of bulk takes place. If any excess of ether present is poured off, and the lower clear liquid *heated* in a sealed tube, it becomes turbid owing to the separation of the ether. This is accompanied by an *increase* of bulk and *absorption* of heat. Triethylamine and water and diethylamine and water are mixtures belonging to this class; the temperature of separation is a function of the ratio in which the two liquids are present. A typical case of the second class is a mixture of alcohol and bisulphide of carbon. These mix with one another in all proportions above 0° C. with *increase* of bulk and *absorption* of heat. Upon being *cooled* to about − 17° C. they separate. The separation of a mixture of ether and water and of a mixture of alcohol and the bisulphide was shown. In these cases the action is regarded as a chemical one, and generally an excess of one liquid or the other is present. To determine the combining proportions two methods were used. In the first a number of mixtures of the same two liquids in different proprtions were taken, and the rise or fall of temperature produced by their mixture measured. When this was a maximum, there might be assumed to be no "dead matter" present. In the second method, which is more delicate, but more laborious, and which was used when the approximate combining proportion had been found by the first, the change of volume produced by mixture was noted; when this increment is a maximum, the liquids are present in their combining proportion. These experiments gave very concordant and definite results: for example, the molecular compound of ether and carbonic sulphide is represented by the formula $C_4H_{10}O,2CS_2$, and that of chloroform and carbonic sulphide by $CHCl_3,CS_2$. A striking confirmation of this view is afforded by the behaviour of the vapour-tension of a mixture. The temperature being constant, if the vapour-tension is plotted with the percentages of the more volatile liquid as abscissæ, the curve is, for a mixture of two liquids which have no chemical action upon one another, as the iodide and bromide of ethyl, a straight line. For ordinary mixtures, however, this is not the case. A curve is obtained in which there is observable at a certain point an irregularity. The corresponding abscissa indicates the molecular combination found by the previous experiments.—Dr. C. R. Alder Wright read a paper by himself and Mr. C. Thompson, on voltaic and thermo-voltaic constants. In a former paper the authors had stated that in a cell set up with two metals immersed in pure solutions of their corresponding salts, a given increment in the strength of the solution surrounding the metal acquiring the higher potential causes an increment (*a*) in the E.M.F. set up (*e*), while an increment in the strength of the other solution causes a decrement (*b*) in the E.M.F. This law is now substantiated; it is, however, found that for dilute acids, instead of metallic salts, (*b*) may be negative. The authors also find that it is possible to represent the E.M.F. of a cell by the difference of two quantities which they term the voltaic constants. These are quantities, one relating to each plate and its surrounding liquid. The voltaic constant of a metal and a liquid is a function of the nature of the metal surface, the strength of the solution, and the temperature, but is independent of the opposed plate and its liquid; it is practically defined as the E.M.F. set up when opposed to a zinc plate in a solution of the corresponding salt of the same molecular strength. The authors further conclude that the E.M.F. of a given combination usually *stands in no simple relationship to the chemical action taking place in the cell*, but that it may be expressed by the sum of the mechanical equivalent of the chemical action per electro-chemical equivalent, and the difference of two quantities, one being related to each metal and its surrounding liquid, and being constant for that metal and liquid termed *thermo-voltaic constants*. This thermo-voltaic action may act with or against the chemical action in producing E.M.F. In some cases, as in that of a cell composed of iron in ferrous sulphate and cadmium in cadmic sulphate solutions, the E.M.F. is against and greater than that produced by chemical action; consequently the cell works backwards with absorption of heat. At the close of the paper Prof. Ayrton and Dr. Guthrie remarked upon the apparent exception here shown to the second law of thermodynamics.

PARIS

Academy of Sciences, November 3.—M. Rolland, President, in the chair.—Observations of the new planet 244 made on October 22 to 24 with the equatorial *coudé*, with remarks on the efficiency of this instrument, by M. Loewy. The author gives a full account of the performance of this equatorial, which has now been installed in the Paris Observatory for the last two years. His opinion of its excellent qualities is supported by the testimony of Dr. Gill and Mr. Norman Lockyer, the latter of whom pronounces it one of the instruments of the future.—A first study on the parallax of the sun, by M. Bouquet de la

Grye. This paper is based on the calculations made in Mexico by the author and M. F. Arago during the late transit of Venus. From the measurements then taken there results a mean parallax of 8·76 with an apparent approximation of 1/100 of a second.—Studies made at the Physiological Station on the locomotion of men by means of the odograph, by M. Marey. These studies have been undertaken mainly with a view to practical results. One of the objects has been to determine the most favourable conditions under which military forced marches can be accomplished most rapidly and with the least expenditure of muscular energy. The paper is accompanied by two illustrations, showing the readings of the odograph for a man walking at the rate of sixty paces per minute, and the curves of velocity and of the length of stride under various conditions.—A fresh contribution to the study of the Permian reptiles, by M. A. Gaudry.—Note on complex numbers, analogous to the quaternions of Hamilton, by M. H. Poincaré. The various problems connected with this subject are reduced to the following: to find all the continuous groups of linear substitutions variable to n, whose coefficients are linear functions of n arbitrary parameters. This problem is here dealt with.—On the involution of higher dimensions, by M. N. Vanecek.—On some general properties of algebraic surfaces of any degree, by M. Maurice d'Ocagne.—Note on algebraic equations, by M. Berloty.—On the conditions of equilibrium of a liquid mass subjected to electro-magnetic action, by M. G. Lippmann.—Conditions of a helicoidal element for the maximum of efficiency in a screw propeller, by M. Ch. Hauvel.—A comparison of the weighted thermometer with the tubular thermometer, by M. Em. Barbier. The author presents a fresh proof of the proposition already demonstrated by M. Regnault, that if the two instruments agree at the two fixed points, they remain in agreement at all fixed temperatures.—Description of two portable electric lamps, invented by M. G. Trouvé. The author, who gives two illustrations, describes two types of electric lamp, one suited for domestic purposes, the other for workshops, factories, mines, &c. Superiority over all others is claimed for both, on the ground of lightness, portability, convenience, and absolute security even in the most explosive atmospheres.—On the decomposition of the oxide of copper by heat, by M. E. J. Maumené.—Experimental researches on the temporary preservation of various virulent agents in animal organisms, where they remain in a quiescent state, by M. G. Colin. From these experiments it appears that the virus, in passing to animals where it is harmless, may preserve its properties intact for one or two weeks even under unfavourable conditions. It is also shown that in certain refractory cases the virus may give rise to serious and even fatal disorders without any apparent analogy to those caused by it in normal subjects; and further that the same animals may serve several times at varying intervals for the transmission of the poison, although a first inoculation may not have produced in them the attenuating effects of vaccination.—On the employment of the sulphate of copper for the destruction of mildew, by M. P. de Lafitte.

BERLIN

Physiological Society, October 31.—Herr Aronsohn presented a report of experiments which he had instituted in conjunction with Herr Sachs, and which had led to the discovery of a thermal centre in the cerebrum. Starting with the idea that in consequence of a diabetic prick of the medulla oblongata an increase of temperature would manifest itself in the liver, and finding by experiment no confirmation of this conjecture, Herr Aronsohn pushed his investigations for other thermal centres in the brain, and in the course of these researches came upon a spot where, on wounding it with a needle, a very considerable rise of temperature quickly set in. The speaker was not able to specify more exactly the spot at which it was necessary to make the prick in order to produce this effect. It was at all events certain that it was rather limited, and should be determined by more minute anatomical examinations of a number of brains of animals preserved in chromic acid after being operated on. Equally deep pricks made at every other spot of the cerebrum had either produced no effect on the temperature of the body, or had lowered it somewhat. In all the successful cases the corpus striatum was pierced by the needle; in all the unsuccessful cases the corpus striatum remained untouched. There was yet, however, no warrant from this circumstance to conclude where the exact seat of the thermal centre was situated.—Dr. Rawitz described some observations he had made with reference to the copulation of snails, a subject which had hitherto no been investigated. He further communicated from his own experience that snails (*Helix pomatia* and *hortensis*) could, in a state of captivity, be fed on paper. Dr. Kossel confirmed this statement from his own observations, and related that, on feeding snails with highly calcareous paper, abnormal calcareous deposits were observed in their monstrously developed shells.

VIENNA

Imperial Academy of Sciences, October 9.—Preliminary communication on monocyclic systems, by L. Boltzmann.—On the anatomical process of tabes dorsalis, by A. Adamkiewicz.—On double refraction of light in liquids, by E. von Fleischl.—On the comets recently discovered by Barnard (Nashville) on July 16, and by Wolf (Heidelberg) on September 17, and on their ephemerides and elements as computed by K. Zelbr at the Vienna Observatory, by E. Weiss.—On the development of the walls of arteries, by B. Morpurgo.—On the perception of sound, by E. Bruecke.—On the action of benzoyl-hyperoxide on amylene, by E. Lippmann.

STOCKHOLM

Society of Natural Sciences, October 18.—Prof. Sandahl, President, in the chair.—On foreign physiological institutions, by Dr. Tigerstedt. Referring to the development of physiology during recent years, the speaker described some of the principal institutions abroad, having visited forty of this kind. A similar one, on a smaller scale, was being established at the Carolina Institute in Stockholm.—The President, announcing the death of Dr. Regnell, the Brazilian Mæcenas, referred to the valuable botanical collections he had presented to the Upsala University.—Prof. Aurivillius exhibited a collection of butterflies, preserved by Herr E. Holmgren by removing the intestines and inflating the specimens. They were in splendid condition, the colours being particularly bright.—On the habits of the eider-duck and the dottrell, by Dr. Sundström. The speaker stated that careful study had proved that the eider-hen does not, as is so generally supposed, take her young during the summer into the ocean, but remains among the islands on the coast. The bird had greatly increased in the south of Sweden during the last few years.—On thunderbolts, by the same.—Herr Neves reported the receipt from Finland of eggs of the eagle, *Aquila clanga*, and the snipe, *Terekia cinerea*.

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